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BAKER BOTTS, LLP			WIESE, NOAH S	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

debbie.allen@bakerbotts.com

Office Action Summary	Application No. 10/566,657	Applicant(s) BOWE ET AL.	
	Examiner NOAH S. WIESE	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-19 is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-13 and 20 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 14 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Status of Application

1. Acknowledgement is made of amendments filed 06/05/2008. Upon entering the amendments, the claims 2 and 6 are amended and claims 13-20 are added.

The claims 1-20 are pending and presented for the examination.

Objections Withdrawn

2. Claim 2 has been amended to overcome the objections set forth in the previous office action. Therefore, the objections to the claims have been withdrawn.

Applicant's Arguments

3. Applicant's arguments filed 06/05/2008 have been fully considered but are not persuasive.

Applicant argues that the combination of Dupin and Muramatsu does not disclose a process for coating a metal substrate with a layer of ceramic *suitable as a support for a Fischer-Tropsch catalyst*. Applicant premises this contention on the fact that Dupin and Muramatsu do not explicitly teach that their supports are used for this specific purpose. However, the instant claims merely state that the support is *suitable as a support for this purpose*. This is an intended use, and thus the fact that Dupin and Muramatsu do not specifically teach this purpose does not render the claims distinct over the prior art. It is clear that the supports taught by Dupin in view Muramatsu would be suitable as supports for Fischer-Tropsch catalysts. Thus, this argument is not persuasive.

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Applicant further argues that the process taught by Dupin and Muramatsu does not teach adjusting the pH of the slurry so that slurry is of high viscosity. Applicant contends that because Dupin teaches a dipping, rather than spraying process, and because the viscosities and pH values disclosed are lower than those in applicant's specification, that Dupin does not teach adjusting pH for high viscosity. However, "high viscosity" is clearly a relative term. While Dupin teaches viscosities lower than those in applicant's specification, the viscosities are higher than those taught by Muramatsu. Undoubtedly the viscosities are also higher than other slurries used for coating catalytic supports. Therefore, the viscosities taught by Dupin could be considered to be adjusted to a high viscosity. Further, Dupin teaches that a thickener is added to the slurry, indicating that higher viscosity is advantageous. Thus, even though Dupin and Muramatsu teach viscosities lower than those in applicant's specification, these numbers are not in the independent claim 1 and therefore fail to show that Dupin does not teach adjusting the pH for high viscosity. Therefore, this line of arguments is not persuasive.

Applicant additionally argues that Dupin and Muramatsu do not disclose the step of spraying droplets of the slurry onto a hot metal substrate at a temperature of 500-750°C. Applicant contends that this is because Muramatsu teaches using these high temperatures for a different purpose than is disclosed in instant specification. However, this argument is not persuasive because Muramatsu teaches that the high temperatures are used to remove the organic component of the slurry and Dupin clearly teaches that the slurry used can have an organic thickener component (see column 6, lines 10-12).

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Thus, when using the Dupin slurry with the Muramatsu process one would indeed have been motivated to use the higher temperatures. Because one would have been motivated to use the Dupin slurry with the Muramatsu process and would have been motivated further to use the high temperatures taught by Muramatsu, this obviously modified process does, in fact, teach all of the limitations of instant claim 1.

Applicant argues that the dependent claims 2-8 and 11-12 are distinct from the applied prior art because of additional reasons to those discussed above. Applicant argues that Dupin and Muramatsu do not teach incorporating a catalytic metal into the ceramic layer. However, as discussed in the previous office action, Dupin teaches that the coated supports are useful as catalyst supports, which would make it clear to one of ordinary skill in the art that catalytic metal should be incorporated into the porous oxide layer. Further, while Muramatsu teaches incorporating titanium into the porous titania layer, this would constitute incorporating a catalyst metal into the layer and therefore read on the claim as written.

Applicant requests a reference to show that repeated incorporation and calcining of the catalyst was well known in the art. The Examiner submits Foster et al (US 3894965), which teaches a process for depositing a noble metal catalyst on an oxide support material. Foster teaches that a highly preferable embodiment of the loading method involves applying the intended catalyst loading to the support structure not in a simple on-step process but in multiple steps, firing between the steps (see column 2, lines 59-66). The Examiner further submits Sudhakar et al (US 5556824), which teaches a supported catalyst wherein multiple impregnations may be employed to

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prepare catalyst with desired Group VIB metal loading (see column 6, lines 4-6). These teachings indicate that it was well known in the art to use multiple loading and calcining steps to increase the catalyst load.

Applicant argues regarding claim 9 that the teachings of Johnson do not show that the use of a solvent comprising an organic liquid whose surface tension and viscosity are lower than water would have been obvious to one of ordinary skill in the art. Applicant contends that the reference has been misinterpreted because Johnson does not teach a process for impregnating a ceramic layer with catalyst metal. However, it seems as though Applicant has misinterpreted the previous office action. As previously discussed, the Johnson reference is used only to show that solvents with the properties of the claim limitations were known to be useful in impregnation processes, because Dupin and Muramatsu are silent to the specific solvents used. Therefore, the purpose of the impregnation process taught by Johnson is immaterial to its use in modifying Dupin and Muramatsu. Therefore, applicant's arguments in this regard are not persuasive.

Regarding the amended claim 6, the newly added limitations to the claim render it distinct over the applied prior art. Thus, the 103 rejections to claims 6 and 7 are withdrawn. The rejections previously issued for the non-amended claims are maintained for the reasons set forth above.

Previous Art Rejections

4. Claims 1-5, 8, and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112).

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Regarding **claim 1**, Dupin teaches a method of coating an alumina-based slurry onto a metallic substrate for use as a catalyst. The coating slurry comprises water, and alumina binder, and a mixture of dispersible particulate alumina and undispersed particulate alumina filler. The alumina filler has an average particle size of 1-15 μm (see claim 1). The amount of dispersible alumina is between 10 and 40% of the particulate alumina (see claim 2). Dupin teaches that alumina binders whose viscosity can be varied by adjusting pH are known in the art, and that such a binder should be used for the alumina coating slurry (see column 3, lines 4-5 and 10-15). Therefore, it would be obvious to one of ordinary skill in the art that Dupin teaches adjusting the pH of the slurry so that it is of high viscosity.

Claim 1 differs from Dupin because Dupin does not teach that the substrate is coated by spraying the slurry onto the substrate with the substrate being heated to at temperature of 500°C to 750°C. However, the method of preparing a catalyst by spraying an oxide slurry onto a heated substrate was known in the art at the time the invention was filed. Muramatsu teaches a method of preparing a photocatalyst by spraying a colloidal metallic oxide solution onto the support while the support is heated to a temperature of between 200°C and 800°C, and in particular, 500°C (see Abstract, paragraph 0064, paragraph 0072, and paragraph 0087. *Per MPEP 2144.05, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists*). One of ordinary skill in the art would have been motivated to use the spraying technique taught by Muramatsu to apply the slurry taught by Dupin because Muramatsu teaches that spraying onto a heated substrate improves the adhesion of the coating slurry (see paragraph 0013). This is clearly an advantageous improvement for coated catalyst supports. One would have expected reasonable success in this modification because both Dupin and Muramatsu teach methods of coating substrates with oxides for use as catalyst supports, so no detrimental results would be expected from the modification. Therefore, claim 1 is obvious and not patentably distinct over the prior art of record.

Regarding **claim 2**, Dupin teaches in example 1 a slurry containing 450 grams alumina and 1000 mL (grams) of water. The alumina is dispersed to the extent of 25%.

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This means that 75% of the alumina is undispersed (solid), so the solid content of the slurry and therefore the droplets when the method of Muramatsu is used would be 33.8 wt%. This is greater than 15% solid material.

Regarding **claim 3**, Dupin teaches that it was known in the art to use aluminum-bearing steel as a catalytic substrate to be coated with an oxide layer (see column 1, lines 32-39). Dupin further teaches in the examples that steels are used as the supports to be coated (see examples 2 and 4), but does not teach whether or not the steels contain aluminum. However, these teachings of Dupin would clearly convey to one of ordinary skill in the art that the slurry taught by Dupin could be used to coat aluminum-bearing ferritic steels.

Regarding **claim 4**, Dupin teaches that lanthanum nitrate is added to the alumina slurry as a stabilizer (see example 3). This would cause the ceramic layer to also contain this stabilizer.

Regarding **claim 5**, Dupin teaches that the oxide-coated substrate is subsequently calcined (see column 6, lines 46-50).

Regarding **claim 8**, Dupin teaches that the substrate of the patent is useful for preparing catalysts. This suggests that catalyst material is incorporated into the porous ceramic layer. Additionally, Muramatsu teaches impregnating the metallic oxide layer formed on the catalyst support with a metallic compound (see claim 9). This metallic compound would form a metallic oxide catalytic material when calcined (see paragraph 0076), and therefore the impregnated support would become a catalyst. The teachings of Dupin and/or Muramatsu teach the incorporation of a catalytically active metal into a ceramic layer formed on a substrate. Therefore, the additional limitations of claim 8 are taught, and the claim is not patentably distinct.

Regarding **claim 11**, Dupin in view of Muramatsu teach a catalyst made by incorporating a catalyst material into a support made by an equivalent method of instant claim 1.

Regarding **claim 12**, Muramatsu teaches that titanium tetrachloride is incorporated into the ceramic layer (see paragraph 0076). Contacting the ceramic layer with a salt of a catalytic metal such as titanium tetrachloride would cause a catalytic

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metal to be incorporated. Baking of the ceramic incorporated with the salt solution transforms the titanium tetrachloride into titanium oxide (see paragraph 0076). This baking step would cause drying and calcining of the ceramic layer. Although Muramatsu does not teach repeating the incorporation and baking steps, these steps would be known and obvious to one desiring to increase the metallic oxide load in the ceramic layer. Therefore, claim 12 is not patentably distinct over the prior art of record.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112) and Johnson et al (US 6369000).

Regarding **claim 9**, Muramatsu teaches that titanium tetrachloride is incorporated into the ceramic layer (see paragraph 0076). Contacting the ceramic layer with a salt of a catalytic metal such as titanium tetrachloride would cause a catalytic metal to be incorporated. Claim 9 differs from Muramatsu because Muramatsu does not teach the solvent in which the metal salt is dissolved. However, the use of solvents for catalytic metal salts that meet the limitations of claim 9 are known in the art. The use of an alcohol solvent for the dissolved metal salt would mean using a solvent having a lower surface tension and viscosity than water, and the use of an alcohol solvent for this purpose was well known in the art at the time the invention was filed.

Johnson et al teaches a method of producing a catalyst wherein a solution containing the salt of a catalytic metal is incorporated into an alumina catalytic support (see Abstract). Johnson teaches that the solvent used to hold the catalytic metal salt can be alcohol. As discussed above, alcohol solvents have lower surface tensions and viscosities than water. Therefore, Johnson et al shows that the use of solvents with lower surface tensions and viscosities than water for the incorporation of metal salts into porous ceramic catalytic supports was known in the art at the time the invention was filed. Muramatsu et al does not teach the time of solvent to use for the incorporation, so one would be motivated to consult similar prior art such as Johnson et al to find teachings on possible solvents. Because Johnson et al teaches that alcohol is a possible solvent, one of ordinary skill in the art would have been motivated to use a

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solvent that meets the limitations of claim 9. One would have expected reasonable success because both documents teach the incorporation of metal salts into ceramic supports, and thus the documents are analogous art. Therefore, claim 9 is not patentably distinct over the prior art of record.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112) and Gouzard et al (US 4956322).

Regarding **claim 10**, the claim differs from Dupin in view of Muramatsu because neither document teaches that the catalyst support incorporated with catalytic metal is coated with wax for protection. However, this protective coating step was known in the art to be beneficial at the time the invention was filed.

Gouzard et al teaches a catalytic metal-containing catalyst that is coated with wax in order to protect it from humidity in the air (see Abstract, example, and claim 1). Gouzard et al teaches that because many catalysts are susceptible to alteration upon exposure to air, treatments such as those taught in the patent are useful for protecting said catalysts. This shows that coating a catalyst with wax to protect it from the atmosphere was known in the art at the time the invention was filed, and that one would have been motivated to perform such a coating because of the beneficial effects of the protection. Therefore, the additional limitation of claim 10 is obvious, and the claim is patentably indistinct over the prior art of record.

New Claims

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112).

Regarding **claim 13**, Dupin teaches that the porous alumina layer on the support has both micropores and macropores (see column 1, lines 11-17). No size definitions are given for these pore sizes, but this teaching indicates that the pore sizes cover the

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range from micropores to macropores. Therefore, the Dupin oxide layer would necessarily contain both mesopores and macropores. Further, Muramatsu teaches that the porous layer contains pores with a diameter of 10-100 nm (see paragraph 0032). This indicates that the layer contains mesopores and macropores. As discussed previously, Muramatsu teaches that the porosity of the layer increases towards the surface. Therefore, the teachings of Dupin in view of Muramatsu meet all of the limitations of claim 13, and the claim is obvious and not patentably distinct over the prior art of record.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112) and Johnson (US 6369000).

Regarding **claim 20**, as discussed above, Dupin in view of Muramatsu teaches a method of coating a metal substrate equivalent to that of claim 1. As also discussed above, it would have been obvious to one of ordinary skill in the art to modify Dupin in further view of Johnson in order to specify the type of solvent used to impregnate the salt of the catalytic metal into the porous layer. Johnson teaches that the impregnated metal salt can be a salt of cobalt (see column 4, lines 23-38). Therefore, the teachings of Dupin in view of Muramatsu and Johnson teach all of the limitations of claim 20, and the claim is obvious and not patentably distinct over the prior art of record.

Allowable Subject Matter

9. Claims 6-7 and 14-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the

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limitations of the base claim and any intervening claims. The prior art does not teach or suggest a process of coating a metal substrate with a composition given in the claims wherein the layer is built up using different applications of slurries with different proportions of dispersible particulate alumina. Further, the prior art does not teach or suggest a method for coating a metal substrate wherein the pH is adjusted to a basic value or where the viscosity is adjusted to 13,000-14,000.

10. Claims 16-19 are allowed. The prior art does not teach or suggest a method for coating a metal substrate wherein the pH is adjusted to a basic value or where the viscosity is adjusted to 13,000-14,000.

Conclusion

11. Claims 1-5, 8-13, and 20 are rejected. Claims 6-7 and 14-15 are objected to. Claims 16-19 are allowed.

12. Applicant's arguments are not persuasive at rendering the independent claims allowable. The newly filed claims and amendments have rendered some claims allowable, but claims remain rejected. No new grounds are used in maintaining these rejections. Therefore, **THIS ACTION IS MADE FINAL.**

13. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NOAH S. WIESE whose telephone number is (571)270-3596. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karl E Group/
Primary Examiner, Art Unit 1793

Noah Wiese
August 28th, 2008
AU 1793